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Follicular Nerve Evoked Responses in the Neonatal Rat Barrel Cortex

Nasretdinov A., Akhmetshina D., Valeeva G., Khazipov R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Springer Science+Business Media New York.In the whisker-related somatosensory system, functional organization of the neuronal circuits is typically assessed through exploration of the responses evoked by whisker deflections. Here, we describe the responses evoked in the neonatal rat barrel cortex by direct electrical stimulation of the follicular nerve and its peripheral branches. Individual whisker follicles and follicular nerves were exposed through a cut on the skin. The electrical stimulation of the follicular nerve and the follicle at different locations using bipolar electrodes reliably evoked responses in the corresponding cortical barrel column. General features of the electrically evoked responses were similar to those evoked by the whisker deflection. However, the delays of the responses evoked by the electrical stimulation were 5-6 ms shorter than those evoked by mechanical whisker stimulation. Also, the magnitude of the follicular nerve evoked responses depended on the stimulation site along the follicle and follicular nerve. We propose that electrical stimulation of a follicular nerve and its branches can be a useful approach to assessing the functional follicle topography.

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Keywords

Barrel Cortex, Electroencephalography, Neonate, Rat, Sensory evoked potential, Whisker